that serve 200-600 living units.[138] (VZ-VA Ex. 109 at 28.) The MSM's inefficient and unrealistic outside plant design, however, models a network in which 24.8% of the distribution areas exceed 600 living units. (VZ-VA Ex. 109 at 28; VZ-VA Ex. 142.) By consistently failing to reflect all of the added costs associated with the MSM's inefficient design of distribution plant and minimizing the length of feeder plant, AT&T/WorldCom understate distribution investment and create an inherently inefficient feeder architecture. (*See* VZ-VA Br. at 111, 144; VZ-VA Ex. 109 at 24-25.)

5. AT&T/WorldCom's Misguided Attempt to Derive a 4-Wire Loop Cost from the MSM's Erroneous 2-Wire Loop Cost Estimate Produces Artificial Economies of Scale.

AT&T/WorldCom's attempt to justify their incredibly understated 4-wire loop cost should be dismissed by the Commission. AT&T/WorldCom's cost estimate is premised on the faulty assumption that the MSM's 2-wire loop cost, and each of its components (the network interface device, concentration function, and feeder and distribution elements), are accurate.[139] In fact, Verizon VA has demonstrated that the MSM lacks the ability to calculate these component costs with sufficient specificity and accuracy. (VZ-VA Ex. 109 at 38-40.)

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[138] Moreover, AT&T/WorldCom provide no evidence that the MSM's clustering algorithm produces an efficient result. The Commission adopted the Synthesis Model's clustering algorithm based solely on its use in rural areas and acknowledged that that algorithm, designed to create the smallest number of large clusters, might not be efficient in high-density areas. (AT&T/WCom Ex. 23, Att. B at 5.)

[139] Petitioners' claim that the MSM overstates 2-wire loop UNE costs (AT&T/WCom Br. at 168) is meritless. As explained above, the MSM's flawed assumption that high capacity special access DS0 equivalents are provisioned over 2-wire copper loops causes *all loop plant*, including DLC equipment, to be oversized, thereby understating it costs.

Moreover, AT&T/WorldCom fail to explain why they use one methodology to develop the cost of a 4-wire loop and another methodology to develop DS1 and DS3 loop UNE costs. (VZ-VA Ex. 109 at 38-39.) Unlike Petitioners' approach to determining 4-wire loop costs, their estimate of DS1 and DS3 loop costs completely abandons any effort to determine the costs of the particular components that would be used to provide the DS1 and DS3 services. (VZ-VA Ex. 109 at 39, 43.)

C. The Inputs to the MSM's Loop Module Are Inappropriate and Unsupported.

AT&T/WorldCom improperly adjust the Commission's default input values to further decrease the MSM's already understated loop UNE cost estimates, at times in the guise of injecting some minimal amount of state- and company-specific data into the Commission's universal service model. However, when the use of accurate, state- or company-specific data would *increase* the MSM's UNE loop cost estimates, AT&T/WorldCom predictably advocate the use of the Commission's nationwide default values or, worse yet, unsubstantiated values that cause the MSM to produce even lower costs. Even when Petitioners claim to use Virginia-specific inputs, their proposals tend to be based on distortions of Virginia- or Verizon-specific data and bear no relation to Verizon VA's experience operating a network in Virginia.

Though Petitioners argue that the MSM "calculates loop costs by determining how an efficient network would best be constructed" (AT&T/WCom Br. at 120), the "efficiency" they tout is divorced from any real-world network concern. The combination of inputs they propose would produce a network that no prudent local exchange carrier would or could ever build. Moreover, the modeled network could never provision all the UNEs and services that Verizon VA is obliged to offer, nor could it conform to the service quality obligations required by the Virginia Commission. (*See, e.g.*, VZ-VA Ex. 109 at 5-7; VZ-VA Ex. 108 at 4-7.)

1. The MSM's Inflated Line Counts Produce Substantially Understated UNE Cost Estimates.

As discussed above, Petitioners have dramatically overstated line counts in the MSM by improperly including DS0 equivalents of high-capacity demand and then using an improperly calculated 2002 forecast of this demand.[140/] AT&T/WorldCom's claim that their inflated line count forecasts are somehow appropriate, and result in substantially *overstated* costs, has no merit. (AT&T/WCom Br. at 121-23.) In fact, Petitioners' overstated line counts are one of the biggest contributors to the MSM's substantially *understated* UNE cost estimates. (*See* VZ-VA Ex. 108 at 30-31.) Although the total network investment produced by the MSM increases as a result of the inflated line counts, the per line investment *decreases* due to the incredible (but artificial) economies of scale reflected in the MSM's network — economies that no real-world carrier would or could ever enjoy. (*See* VZ-VA Br. at 151-54; *see also* VZ-VA Ex. 108 at 29-31.)

AT&T/WorldCom's use of inflated line count forecasts is not only conceptually flawed, but inconsistent with other data used in the model. Projecting line counts to year 2002 requires, at a minimum, that the MSM's 1997 customer location data be updated to account for increases in the number of *customer locations* to correspond to the significant increase in *lines*. Petitioners dismiss this proposition, asserting that the number of customer locations in the MSM's obsolete

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140/ As Verizon VA witnesses Dr. Tardiff and Mr. Murphy demonstrated, AT&T/WorldCom's initial forecast of line counts was not only conceptually flawed, but was also the product of a misunderstanding of ARMIS reporting conventions. (VZ-VA Ex. 109 at 31; VZ-VA Ex. 108 at 29-31.) Though Mr. Pitkin's revised forecast was an improvement, it still suffered from the fundamental flaw of including high capacity DS0 equivalents in the line counts used to size the narrowband network. (VZ-VA Ex. 162 at 5-6.) Even after the revision, his forecast calls for the number of special access lines to increase by 50% and account for 34% of all lines by 2002. (AT&T/WCom Ex. 14 at Attachment D; *see also* Tr. at 4295-97.)

customer location database is *overstated.* (AT&T/WCom Br. at 123.) But 1997 customer location data by definition cannot account for the significant growth in customer locations that has occurred in the interim. (*See* VZ-VA Ex. 109 at 27-29, 118.) Moreover, the customer locations in the Synthesis Model (and the MSM) were specifically defined by the Commission to *exclude* unoccupied housing units, which makes it implausible that the customer location data could *possibly* be described as "overstated." In fact, the MSM significantly understates the costs of building to unoccupied residential and business units.[141/] (*See* VZ-VA Ex. 109 at 6.)

2. AT&T/WorldCom's Structure Sharing Assumptions Bear No Relationship to the Limited Structure Sharing Opportunities in Virginia.

AT&T/WorldCom propose changing the Commission's default structure sharing inputs to reflect not Verizon VA's expected structure sharing in Virginia, but significantly greater sharing opportunities that they posit for their hypothetical forward-looking network. In doing so, AT&T/WorldCom ignore Verizon VA's extensive experience with structure sharing opportunities, notwithstanding that their own witness Ms. Murray acknowledged that Verizon VA's experience clearly *is* relevant to determining forward-looking structure sharing

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141/ AT&T/WorldCom's other claims are simply red herrings. For example, they assert that the Commission has assumed that growth in lines has occurred at existing locations (AT&T/WCom Br. at 121-23); however, they fail to mention that this was only with respect to the federal universal service mechanism, and in that context, the line counts were limited to year-end 2000 data. The Commission did not conclude that the use of projected line counts is appropriate. Order and Order on Reconsideration, *Federal-State Joint Board on Universal Service*, 67 Fed R. 3118, 3122 ¶ 8 n.18 (rel. Dec. 18, 2001) (noting that "AT&T concedes that until the Commission adopts some method of projecting model line counts to the year for which support is provided, we should use the year-end line count data filed by carriers...."). The Commission also recognized that the use of 2000 line counts may cause the Synthesis Model to exclude certain costs for new customer locations. *Id.* ¶¶ 11-12.

opportunities. (Tr. at 3218-3219.) Indeed, as explained above, Petitioners themselves quote the Commission for the proposition that forward-looking structure sharing should reflect opportunities that were available when the plant at issue was built. (*See* AT&T/WCom Br. at 178.) But that position is inconsistent with Petitioners' grandiose assumptions that in the future, utilities and other third parties would be *more* willing to share structure than they have been in the past. Even Ms. Murray had trouble explaining why Petitioners' approach made any sense.[142/] (Tr. at 3222-23.)

For example, AT&T/WorldCom make the unrealistic assumption that underground and buried structure investment should be reduced by as much as 50% and 67%, respectively, to account for alleged pervasive sharing with third parties. (VZ-VA Ex. 109 at 96.) Moreover, AT&T/WorldCom assume that, relative to the Synthesis Model's default inputs, opportunities for aerial sharing will reduce an ILEC's pole structure costs by 10-25%, to the point where Verizon VA would pay for only 25% of the pole cost. (VZ-VA Ex. 109 at 97.) The basis for all these assumptions is nothing more than the unsubstantiated speculation of Mr. Riolo. But as explained above, it is completely unrealistic to think that *any* carrier could achieve the level of structure sharing that Mr. Riolo hypothesizes. Not surprisingly, then, these untenable structure

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[142/] AT&T/WorldCom are wrong in alleging that Verizon VA's criticisms are simply a complaint that the MSM's assumptions "do not mirror the degree of sharing that Verizon currently experiences on its embedded network." (AT&T/WCom Br. at 181.) Rather, Verizon VA is simply stating the obvious — no carrier operating in the real world would, or could, experience the level of sharing assumed by the MSM (on a current or forward-looking basis). In fact, because Verizon VA has been operating under price caps for a number of years, its current sharing levels reflect efficient decisions regarding sharing opportunities.

sharing inputs, which AT&T/WorldCom apparently hope to resurrect, have already been rejected by the Commission.[143/]

Furthermore, Petitioners do not dispute that the MSM fails to include sufficient investment in structure to accommodate the facilities of third parties with whom Verizon VA allegedly would share structure costs. (VZ-VA Ex. 109 at 95-96.) As Verizon VA explained, the MSM designs structure separately for loop feeder, loop distribution, and inter-office transport based solely on Verizon VA's demand; as such, the MSM does not account for the additional costs necessary to support other utilities' facilities in shared structures. Nor do Petitioners dispute that the degree of assumed structure sharing must reflect the Virginia-specific operating realities that would affect all possible users of the structure and impact opportunities for the attractiveness of sharing (*e.g.*, local ordinances, safety regulations, currently available technology, prices, etc.).[144/] (VZ-VA Ex. 109 at 96.)

Petitioners' assumption with respect to sharing between an ILEC's distribution and feeder facilities is equally unsupported. Petitioners propose a 40% reduction of the default input values for aerial, buried, and underground feeder based on the simplistic assumption that "[w]hen feeder and distribution follow the same route, the feeder and distribution facilities will and should use the same structure." (AT&T/WCom Br. at 180.) But as noted in Verizon VA's initial brief, Petitioners have provided no evidence that supports the proposed 40% reduction for the Virginia network. (*See* VZ-VA Br. at 156.) Moreover, the MSM's own plant mix assumes

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143/ *Tenth Report and Order* at 20261-62 ¶¶ 244, 247.

144/ Indeed, even the Commission recognized that issues such as the size and spacing of poles may either require a platform change or may be considered in a future proceeding to address changes to the Synthesis Model. *Tenth Report and Order* at 20252 ¶ 222, n. 465; VZ-VA Ex. 109 at 94-95.

that 70% of the feeder plant in the highest density zone is underground, while only 10% of the distribution plant is placed underground.[145/] (AT&T/WCom Ex. 23 at Att. G, 7-8.)

3. AT&T/WorldCom's Adjustments to the Default Synthesis Model's Plant Mix Lack Any Nexus to Operating Realities.

AT&T/WorldCom have made numerous adjustments to the Commission's default plant mix inputs, purportedly to reflect Virginia-specific plant mix data from ARMIS.[146/] (AT&T/WCom Br. at 171.) Petitioners' proposed adjustments have the effect of reducing costs by reducing the amount of underground and buried cable in most density zones. (VZ-VA Ex. 109 at 107-09.) As explained in Verizon VA's initial brief, these adjustments disregard the various factors that dictate cable placement in the real world. (VZ-VA Br. at 82-86, 157-59.) Moreover, these adjustments conflict with AT&T/WorldCom's own scorched-node theory of TELRIC by ignoring recent municipal requirements that new cables be placed underground (in conduit or trenches). (Tr. at 4417 (Murphy); VZ-VA Ex. 122 at 70.) Tellingly, the Commission has

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[145/] AT&T/WorldCom proposed a similar adjustment in the Georgia universal service proceeding, and the Georgia Public Service Commission rejected it. Order, *In Re: Docket No. 5825-U: Universal Access Fund Transition to Phase II Pursuant to O.C.G.A.* § 46-5-167 at 48-49 (Dec. 19, 2000).

[146/] Petitioners' claim that Mr. Riolo's proposed structure mix inputs were obtained from ARMIS data is misleading. (AT&T/WCom Br. at 171.) ARMIS data does not distinguish among feeder, distribution, and transport cables, nor does it differentiate among density zones. Thus, it is unclear how Mr. Riolo's adjustment for each type of facility and zone could be based on ARMIS data. Moreover, Mr. Riolo has not demonstrated that his numerous adjustments to that data, when combined with his feeder-distribution and feeder-transport structure sharing assumptions, produce a network with the statewide sheath mix reflected in ARMIS. Thus, Mr. Riolo's proposed structure mix inputs amount to little more than an arbitrary manipulation of ARMIS data that bears no relationship to the "appropriate mix for each zone" (AT&T/WCom Br. at 171) within Verizon VA's network.

already rejected a plant mix proposal by AT&T that similarly understated the amount of underground placement.[147/]

4. AT&T/WorldCom's Utilization and Fill Factors Are Unacceptably High and Fail to Build a Sufficient Amount of Distribution Plant.

As explained in Verizon VA's initial brief and above (VZ-VA Br. at 159-60), the MSM's target fill factors do not provide sufficient spare capacity to account for critical factors such as administrative and maintenance needs, churn, demand fluctuations, and growth. (AT&T/WCom Br. at 145; VZ-VA Ex. 108 at 15-18.) AT&T/WorldCom's claims regarding the propriety of their various target fill factors are meritless. (AT&T/WCom Br. at 151-52, 157-160.) As Verizon VA has explained, the MSM's proposed target fill factors are unreasonably and implausibly high, and no explanation regarding *how* any carrier could plausibly or efficiently achieve such fill factors is ever provided. Nor do Petitioners ever account for what impact such high fill would have on network operations and service quality; they seem to believe that the levels of spare that exist in the current network could be drastically changed with apparently no impact whatsoever — as if the change could come about merely by wishing it were so. (*See* VZ-VA Br. at 103-04, 159-60; *see also* VZ-VA Ex. 109 at 84.) As a result, the MSM produces a network that would not operate efficiently given the real-world constraints under which Verizon VA provisions service. As noted above, Petitioners are unable to identify a single network that operates at its proposed fill levels (whether target or achieved) on a statewide basis. (Tr. at 4515.)

147/ *Tenth Report and Order* at 20258-59 ¶¶ 236-38.

Thus, for example, in using its target fill factors to build distribution facilities, the MSM ignores accepted planning standards and guidelines that allocate at least two distribution pairs to each residential subscriber location (VZ-VA Ex. 109 at 85-86), and that also account for vacant housing units when building loop plant. (VZ-VA Ex. 109 at 85.) These guidelines are based on decades of LEC experience serving inherently unpredictable demand as cost-effectively as possible. (Tr. at 4202-03 (Gansert).) A real-world carrier that simply ignored these engineering standards and real-world considerations in building a local exchange network could never operate efficiently or meet the Virginia Commission's service quality standards. (VZ-VA Ex. 109 at 86.)[148/] Similarly, the MSM's target fill for copper feeder cable ignores standard engineering guidelines that set aside 15% of total capacity for administrative and maintenance needs. (VZ-VA Ex. 109 at 87.) Moreover, the MSM fails to provide sufficient spare capacity to satisfy the 3 years of growth it assumes.[149/] As for fiber strand, Petitioners finally admit that the MSM employs 12-strand fiber ribbons, as Verizon VA has advocated (and which Mr. Riolo

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[148/] AT&T/WorldCom's claim that Verizon VA never proposed appropriate effective fill factors for use in the MSM is incorrect. (AT&T/WCom Br. at 151.) Verizon VA's witnesses described in detail the appropriate fill factors that an efficient, functional network must, and historically does have. Those are the "effective" fill factors that the MSM's network should produce as well.

[149/] AT&T/WorldCom's effective distribution fill is an average calculated by AT&T/WorldCom witness Mr. Pitkin — it is not a value produced by the MSM. In fact, in computing this effective fill, Mr. Pitkin mixed "apples and oranges" by using his year-end 2002 forecast of demand within the MSM to determine the total number of lines of capacity (*i.e.*, distribution cable terminating at an SAI) (denominator) and his estimate of mid-year 2001 demand to derive the number of working lines (numerator). (AT&T/WCom Ex. 14 at 14, n. 15.) Using the same year for the numerator (6.7 million lines) and denominator produces a distribution fill of 64%, not 52.5%. Based on Mr. Pitkin's static view of the network, by year-end 2004, the MSM's effective fill would approach 100%. (AT&T/WCom Ex. 14 at 14, n. 16 (reporting a *capacity* of 10.4 million lines in the MSM); VZ-VA Ex. 108 at 29 (reporting a projected *line count* of 10.2 million lines in the MSM).)

actually criticized at length on the stand). (AT&T/WCom Br. at 160; Tr. at 4507-08.) As explained above, this ribbon structure produces spare fiber stands within each ribbon. Nevertheless, spare ribbons are needed to facilitate maintenance and rearrangements (Tr. at 4506 (Gansert)), and Petitioners' proposed 100% target fill factor for fiber cable ignores this need.

a) The Effect of the MSM's Inadequate Target Fill Factors Is Magnified by the MSM's Failure to Build to Vacant Housing Units.

As noted above, the fact that AT&T/WorldCom use customer location data that fails to account for vacant housing units contributes to the MSM's significant understatement of costs. Although Petitioners claim that the MSM "includes sufficient capacity to provide service to vacant locations because its customer locations are based in part on a database used for mass mailings" (AT&T/WCom Br. at 145 n.135), they are unable to support this assertion.[150/] For example, AT&T/WorldCom never quantify the number of vacant housing units allegedly covered by the mailing list. In fact, while the 2000 Census Bureau statistics and ARMIS data for Virginia suggest that there are approximately 2.2 million housing units in Verizon VA's service territory, the MSM models only 1.8 million residential households.[151/]

150/ Moreover, AT&T/WorldCom's contention that the MSM builds to vacant housing units is undermined by the Commission's decision to exclude vacant households in the Synthesis Model. *Tenth Report and Order* at 20184-85 ¶¶ 58-59.

151/ The year 2000 Census Bureau statistics for Virginia indicate that there were more than 2.9 million housing units in Virginia, of which more than 205,000 were vacant. United States Census Bureau 2000 General Demographic Characteristics (Table DP-1). Since Verizon VA serves approximately 76% of the switched lines and residential lines in the state, according to ARMIS 43-08 and National Exchange Carrier Association reports, it is reasonable to assume that there are approximately 2.2 million housing units in Verizon VA's territory.

5. The MSM's DLC Input Values Are Significantly Understated.

Verizon VA has demonstrated that AT&T/WorldCom's proposed reductions to the Commission's default DLC inputs are unreasonable (VZ-VA Br. at 161-62), and Petitioners' attempt to rehabilitate those inputs falls short. As support for DLC input values that the Commission already has rejected,[152/] Petitioners now claim that the MSM's "DLC input values as a whole exceed the DLC costs in Verizon's own purchasing contract with Litespan." (AT&T/WCom Br. at 143.) This claim distorts the facts. AT&T/WorldCom's proposed DLC input values appear higher than the values contained in Verizon VA's Litespan contract only because the prices contained in Verizon VA's Litespan contract are *material-only* prices that include no installation costs. AT&T/WorldCom witness Mr. Riolo explained that in contrast, his proposed DLC investment inputs were intended to include both material *and* installation costs. (AT&T/WCom Ex. 6 at 19.) Thus, Petitioners' comparison is meaningless. AT&T/WorldCom's proposed DLC values — which are supported by nothing more than an alleged research report that AT&T/WorldCom neither describe nor disclose and by the unsubstantiated speculation of their consultant[153/] (VZ-VA Ex. 109 at 110) — must again be rejected.

[152/] *Tenth Report and Order* at 20275 ¶¶ 278-279; *See also* VZ-VA Ex. 109 at 110.

[153/] AT&T/WorldCom revealed the name of the report, but never placed it on the record in these proceedings. Moreover, as Mr. Riolo indicated, he relied on this report only for his DLC line card costs, and thus all of his other erroneous DLC costs (*e.g.*, common equipment and site preparation) are based solely on his unsubstantiated opinion. (AT&T/WCom Ex. 6 at 15 n.11, AT&T/WCom Ex. 18 at 12 n.17.)

6. AT&T/WorldCom Have Presented No New Arguments in Support of Their Reduction of the MSM's Road Factor.

In its initial brief, Verizon VA demonstrated that Petitioners' proposed reduction of the MSM's road factor from 1.0 to 0.9 is inappropriate and unjustified. (VZ-VA Br. at 166-67.) Contrary to the Commission's instruction that any change in the road factor be based on an empirical, state-specific analysis (VZ-VA Ex. 109 at 103), AT&T/WorldCom attempt to justify their downward adjustment to the default road factor by pointing to an obscure study conducted in Kansas and the cost model BellSouth has proffered in other jurisdictions. Neither of these reflect Virginia-specific conditions or were made part of the record in this proceeding.[154/] (VZ-VA Ex. 109 at 102-03.) In short, AT&T/WorldCom's claim that their downward adjustment is needed "to correct for the Synthesis Model's use of surrogate customer location data that overstates dispersion" (AT&T/WCom Br. at 126) is unjustified and unsupported. The Commission was right to reject the adjustment before and should do so again here.[155/]

7. The MSM Does Not Include Sufficient Costs for DS1 and DS3 Loop Electronics.

Petitioners erroneously claim that the MSM "includes more than sufficient costs for the line cards needed for DS1 and DS3 service." (AT&T/WCom Br. at 167.) Once again, AT&T/WorldCom inappropriately compare their estimate of $322 for an *installed* DS1 line card,

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154/ In addition, the Kansas Order was based on the default version of the Synthesis Model, which did not include Mr. Pitkin's coding and input changes. Because those changes reduce the route distances produced by the Model, it is all the more inappropriate to reduce the road factor in this proceeding based on the Kansas Order. (VZ-VA Ex. 108 at 32.)

155/ *Tenth Report and Order* at 20179 ¶ 46 ("In the absence of a reliable source of actual customer locations by which to compare the surrogate locations, it is impossible to substantiate AT&T and MCI's contention that the road surrogate algorithm overstates the dispersion of customer locations in comparison to actual locations."); *see also id.* at 20179, ¶ 46, n.110.

which includes *both* the central office and remote terminal ends, with Verizon VA's *material-only* cost of **[BEGIN VERIZON PROPRIETARY] XXX [END VERIZON PROPRIETARY]** which only includes *one* end. (AT&T/WCom Ex. 14 at 49.) In fact, AT&T/WorldCom witness Mr. Riolo acknowledged that the cost of a DS1 line card generally ranges from $400 to $500. (Tr. at 4532 (Riolo).) Absent the requisite investment for line cards at both the originating and terminating ends, the network modeled by the MSM would be incapable of providing DS1 and DS3 services.

Equally troublesome is the MSM's failure to build the fiber over which the DS1 and DS3 services are provisioned. AT&T/WorldCom acknowledge this modeling flaw, yet respond to Verizon VA's criticism with the spurious claim that "the fiber itself is very inexpensive and certainly *costs less than the copper* that the [MSM] does build." (AT&T/WCom Br. at 167 (emphasis added).) AT&T/WorldCom miss the point. The comparative cost of fiber is irrelevant because, as discussed above, treating the fiber-based, high capacity demand as millions of ordinary loops with fictitious *copper* distribution facilities models economies of scale that could not exist in a real network. Thus, the MSM's failure to model fiber for these services, and its erroneous assumption that high capacity services can be provisioned over copper facilities instead, only contributes to the MSM's understatement of costs.

8. Petitioners' Pole and Drop Wire Investment Has No Basis in Reality.

AT&T/WorldCom's claim that the MSM's pole investment is "more appropriate" than the value used in Verizon VA's cost study is meritless. (AT&T/WCom Br. at 183.) Their claim is based on the erroneous assumption that all poles throughout Verizon VA's entire network, would be instantaneously replaced. (AT&T/WCom Br. at 183-84.) As explained above, this assumption defies common sense. Even in a forward-looking environment, a carrier is not going

to be deploying poles only on new installations; rather, an efficient, forward-looking carrier's base of poles would reflect a mix of new installations and replacements. (Tr. at 4097 (Tardiff).)

AT&T/WorldCom also significantly understate the amount of drop cable that would be required in a fully-functioning, efficient network. (VZ-VA Ex. 109 at 104.) The MSM produces a drop length of only 27.3 feet – less than 53% of the average drop length produced using the Synthesis Model's default values, which are already significantly understated. (VZ-VA Ex. 109 at 105; VZ-VA Ex. 142.) Even in small, dense clusters, this is a ridiculously low drop length, drastically different from the drop lengths AT&T/WorldCom have advocated in other UNE proceedings.[156/] (VZ-VA Ex. 109 at 105.)

AT&T/WorldCom erroneously claim that the drop length produced by the MSM is actually 77.4 feet, rather than 27.3 feet. (AT&T/WCom Br. at 184.) To derive this estimate, AT&T/WorldCom divided the total drop length produced by the MSM by the number of drops or customer *locations*, instead of the number of *lines*, as Mr. Murphy has done. (AT&T/WCom Ex. 14P at 39-40.) This is clearly inappropriate. As *Telcordia* states, the national average drop length of 73 feet, referenced by Mr. Murphy and relied upon by AT&T/WorldCom in the development of the HAI Model, was derived on a per line (working pair) basis, not the per drop (or per customer location) basis Mr. Pitkin uses. (AT&T/WCom Ex. 122 at 12-8; VZ-VA Ex. 109 at 105.) Thus, AT&T/WorldCom's attempt to compare the MSM's average *per customer* drop length of 77.4 feet with the Telcordia *per line* drop length of 73 feet is highly misleading.

156/ In the ongoing Massachusetts UNE proceeding, AT&T/WorldCom advocate drop lengths ranging from 50 to 150 feet depending on the density zone. These differences cannot be explained or reconciled by simple reference to the geographical differences between the two states. (VZ-VA Ex. 109 at 105.)

As Mr. Murphy explained, when calculated correctly on a per line basis, the average drop length produced by the MSM is approximately one-third of the national average. (VZ-VA Ex. 109 at 107.) Moreover, whether calculated on a per line or per location basis, neither the drop length nor the drop investment generated by the MSM changes when the line count is significantly increased or decreased — a result that is completely contrary to what one would expect to see in a real-world network. (Tr. at 4542-43 (Tardiff).)

D. The MSM's Misguided Approach to Estimating Expenses Does Not Produce Accurate Estimates of Verizon VA's Forward-Looking Expenses.

Apparently unwilling to confront Verizon VA's numerous criticisms of the MSM's expense calculations, AT&T/WorldCom instead attempt to side-step them, claiming that "Verizon presents few criticisms of the expense calculations in the [MSM]." (AT&T/WCom Br. at 106.) In fact, as set forth below, Verizon VA's criticisms are numerous. Moreover, while Petitioners seek to rely on the fact that Verizon VA did not propose alternative expense inputs for use in the MSM, (AT&T/WCom Br. at 106), Verizon VA has made clear that the alternative methodology and the inputs it has used in these proceedings are far superior to those used in the MSM, thereby obviating any need to present alternative inputs to an inferior model.

1. The MSM's Corporate Overhead Factor Understates Forward-Looking Overhead Expenses.

AT&T/WorldCom have tried to defend their use of an 8% corporate overhead factor as "extremely conservative" and similar to the factor used by Verizon VA. (AT&T/WCom Br. at 107.) But Petitioners' approach and the application of their factor are conceptually flawed and inconsistent with the assignment of other common support services expenses (*e.g.*, network

operations), as well as with the Synthesis Model's logic, which includes these expenses as a dollar amount per unit of demand. (VZ-VA Ex. 109 at 75-76.)

AT&T/WorldCom calculate the 8% factor based on the ratio of overhead costs to all other costs, but then proceed to apply the factor to the MSM's estimate of all other *forward-looking* costs — a base of expenses that is inconsistent with the base from which the factor was developed. (VZ-VA Ex. 109 at 76.) Petitioners ignore the fact that it is not logical to assume that whenever, hypothetically, the cost of all network components are reduced by 50%, then the expenses to operate that network similarly would be reduced by 50%. By blindly reducing expenses through illogical application of their factor, Petitioners produce expenses that are a fraction of what Verizon VA needs to run its current network (VZ-VA Ex. 108 at 67-68), and similarly understate the forward-looking overhead expenses that would be required to support the UNE-related facilities and services provisioned by Verizon VA. (VZ-VA Ex. 109 at 76; VZ-VA Ex. 108 at 67-68.) Tellingly, while Verizon VA incurred corporate expenses (USOA Accounts 6710 and 6720) of about $148 million in 2000, the MSM produces an estimate for these accounts that is about $45 million — less than one-third of that amount. (VZ-VA Ex. 108 at 67-68.)

2. The MSM Fails to Flow Through Network Operations Expenses.

Petitioners have conceded that the MSM's overly complicated process for assigning network operations expenses is flawed and that the MSM loses a portion of the network operations expenses. However, they have never recognized the full impact of the problem. Their initial brief continues to argue that the problem was limited to the failure to flow through 6% of the expenses to individual UNEs and argues that they have fixed this problem (AT&T/WCom Br. at 108-09), even though Mr. Pitkin has acknowledged that the problem

impacted at least 13% of the expenses. (AT&T/WCom Ex. 14 at 22; AT&T/WCom Ex. 104.) However, Dr. Tardiff has demonstrated that the MSM actually fails to flow through almost 25% of the total amount of network operations expenses, not 6% (or 13%) as AT&T/WorldCom claim. (VZ-VA Ex. 162 at 15.)

3. AT&T/WorldCom's Exclusion of Marketing Expenses Is Inappropriate and Unjustified.

Petitioners' complete exclusion of all marketing expenses is illogical, and even Petitioners' own witnesses do not appear prepared to support this complete removal. Although AT&T/WorldCom exclude all marketing costs in their model, they implicitly concede that at least some marketing expenses are likely to be associated with the UNE wholesale business, finding themselves unable to say anything more categorical than that "few if any marketing expenses are associated with the wholesale customer." (AT&T/WCom Br. at 109.) At the hearing, Mr. Pitkin similarly was unable to support a categorical exclusion of marketing expenses, saying simply that "they certainly shouldn't all be included." (Tr. at 3862.)

Rather than determine an amount of marketing expenses that likely would be incurred in connection with the wholesale provision of UNEs, and which accordingly should be included in the MSM, AT&T/WorldCom simply excluded all such costs. (VZ-VA Ex. 109 at 69-70.) As a result, the MSM fails to account for many of the costs indubitably associated with UNE-related activities, such as product forecasting, product management, regulatory implementation, and other activities specifically devoted to assisting the wholesale market. (VZ-VA Ex. 109 at 69.) Verizon VA's approach, which uses current advertising expenses as a proxy and recognizes other appropriate marketing costs in its ACF, is far more legitimate.

4. The MSM's Flawed Method of Calculating General Support Expenses Omits Essential Expenses.

The MSM's 32% across-the-board reduction of general support expenses is a remnant of the Synthesis Model's universal service design and is inappropriate and unjustified in a UNE context. AT&T/WorldCom erroneously assume that the services excluded by the Commission for USF purposes (*i.e.*, special access and toll) should be excluded when calculating UNE costs. (AT&T/WCom Br. at 110; AT&T/WCom Ex. 1 at 15-16; AT&T/WCom Ex. 14 at 11-12.) However, these services are included in the demand volumes used to size the network, and thus should be used to determine the demand for support assets. (VZ-VA Ex. 108 at 63.) Petitioners' method of calculating general support expenses omits essential expenses, thereby producing unrealistic and substantially reduced UNE cost estimates.

Petitioners assert that a "far higher proportion of general support expenses should be excluded in calculating UNE costs than in calculating costs for USF purposes." (AT&T/WCom Br. at 110.) But they never provide any cogent or compelling explanation for why this should be so. Furthermore, Petitioners' failure to include any investment for the land required for General Support services facilities is flawed. (VZ-VA Br. at 170.) The Commission has recognized that the exclusion of such investment was erroneous. (*See* VZ-VA Ex. 108 at 82, 112.)

5. The MSM's Maintenance Factor Ignores the Fact That Maintenance Costs Are Generally Unrelated to the Initial Investment.

In seeking to defend the MSM's reduction in maintenance costs, AT&T/WorldCom claim Verizon VA has not recognized that "new equipment and a technology mix [with a] substantially increased use of fiber" would be cheaper to maintain. (AT&T/WCom Br. at 111.) But Verizon VA never took issue with this point. Verizon VA criticized and exposed the absurdity of AT&T/WorldCom's assumption that reductions in equipment costs, or investment, produce a

linear (or any) reduction in maintenance costs. (Tr. at 3778 (Tardiff); VZ-VA Ex. 108 at 60-61.) Verizon VA's criticism focused on the MSM's unyielding and unrealistic assumption that changes in the purchase price of equipment directly impact the subsequent cost of maintaining that equipment (*e.g.*, assuming that the cost of maintaining a car will decrease by 25% just because that car's purchase price is cut by one-quarter). (VZ-VA Ex. 108 at 59-60.) This approach, as explained in detail in the discussion of Verizon VA's ACF methodology, is nonsensical.

6. The MSM's Use of Generalized, Nationwide Values for Various Expense Calculations Is Inappropriate and Unnecessary.

Although AT&T/WorldCom tout the inclusion of Verizon VA-specific data in the MSM, when it comes to expense calculations, they rely principally on the generalized national data used in the Synthesis Model, thereby ignoring the available, and highly relevant, state- and company-specific data on the record in these proceedings. To suggest that these nationwide values somehow "more accurately reflect the costs that an efficient carrier would incur on a forward-looking basis" is simply absurd. (AT&T/WCom Br. at 112.) Indeed, in adopting the Synthesis Model's default nationwide values, the Commission made "no finding as to whether nationwide values would be appropriate for purposes other than determining federal universal service support."[157/] The preponderance of the Synthesis Model's inputs represents nationwide values that are derived from investment and expense calculations of different vintages and have no relevance to any of Verizon VA's operating realities. (VZ-VA Ex. 109 at 77-78.)

157/ *Tenth Report and Order* at 20172 ¶ 31.

Moreover, AT&T/WorldCom's claim that "[t]he use of nationwide values also generally avoids the need to verify the reasonableness of each company's data" is absolutely true. (AT&T/WCom Br. at 112.) But the whole point of a UNE proceeding is to determine the forward-looking TELRIC costs of a specific company provisioning UNEs in a specific state. Assuming away the need to calculate company-specific costs may make it easier for AT&T/WorldCom to achieve their fantastically low UNE cost estimates, but that approach has no place in a UNE costing analysis.

7. The MSM Does Not Provide for a Sufficient Amount of MDF and Power Investment.

The MSM fails to provide a sufficient amount of main distribution frame and power investment. AT&T/WorldCom's claim that Verizon VA's "MDF and power investments factor[s] are almost the same as those used in the [MSM]" (AT&T/WCom Br. at 20) is incorrect and represents another attempt by AT&T/WorldCom to trivialize the MSM's numerous infirmities. First, the MSM includes only $8 in MDF and power costs per *switched* line. (VZ-VA Br. at 162-63; VZ-VA Switching Br. at 31 n.40.) As a result, the MSM fails to include power costs associated with non-switching equipment, such as circuit equipment. (*See* AT&T/WCom Ex. 23.) Second, as Verizon VA demonstrated, this number is taken from the universal cost proceeding and was developed by misinterpreting data provided by Technology Futures Inc. (VZ-VA Ex. 109 at 91-92.) The MSM therefore significantly understates power costs.

VI. NON-RECURRING COSTS

The support AT&T/WorldCom proffer in their brief for both their non-recurring cost model and their attacks on Verizon VA's model essentially boils down to the refrain that their

model is forward-looking because it assumes "mechanized processes," while Verizon VA's allegedly does not. But Petitioners cannot mask a critical failing: the utter absence of evidence in the record establishing that any currently available technologies or processes would enable Verizon VA to achieve the purported efficiencies they so blithely assume. Petitioners' proposed work times similarly lack any foundation. They are based on nothing more than the unsubstantiated hypotheses of a few purported, paid experts. And finally, AT&T/WorldCom simply assume some non-recurring costs into oblivion, calling them recurring costs but then failing to account for them at all. By contrast, Verizon VA's model is based on a statistically sound survey of workers who actually perform the relevant tasks to determine how long each task takes today, and it reflects realistic forward-looking adjustments to account for anticipated future mechanization and process improvements that may reduce the time needed to perform the activities or even the need to perform them at all. And Verizon VA's model appropriately accounts for all non-recurring costs that Verizon VA will incur to process and provision CLEC orders.

The Commission should reject Petitioners' apparent view that non-recurring costs are TELRIC-compliant only if they are based upon an entirely hypothetical — and in cases implausible — network construct and pure speculation concerning required work times. Instead, the Commission should adopt Verizon VA's non-recurring cost model, which is based on a forward-looking network architecture that has at its root a functioning network design, reflects realistic service order and provisioning costs, and uses work times based on a statistically sound survey methodology that produces informed results. Finally, the Commission should adopt an approach that correctly distinguishes between recurring and non-recurring costs and ensures that

incumbents have an opportunity to recover the latter through non-recurring charges on the CLECs who cause such costs.

A. Verizon VA's Model Is Based on Appropriately Forward-Looking Assumptions.

AT&T/WorldCom contend that Verizon's non-recurring cost model uses an "embedded cost methodology" because it fails to reflect the use of forward-looking technologies and systems hypothesized by Petitioners. (AT&T/WCom Br. at 210.) But in making this argument, and in their "forward-looking" technology and OSS proposals, AT&T/WorldCom demonstrate a complete disregard for TELRIC's express mandate that costs be based on currently available technology, not purely hypothetical technology or systems that may develop — and may perform as hoped — at some unknown time in the future. Verizon VA's approach, which considers the use of technology, software, and systems that are available and capable of performing the required functions, is not only a more sensible approach to estimating forward-looking non-recurring costs — but the one that TELRIC requires.

1. Technology Assumptions

AT&T/WorldCom argue that Verizon VA's non-recurring model is not appropriately forward-looking because it fails to reflect the same forward-looking assumptions regarding the amount of IDLC feeder as in Verizon VA's recurring model (or more generally, that it simply fails to reflect enough IDLC at all). This argument is important to Petitioners because, in their view, more IDLC in the network would reduce non-recurring costs by eliminating the need for manual cross-connects at the central office for unbundled loops. (AT&T/WCom Br. at 203, 210-12.) But this argument is premised on Petitioners' assumption — now discredited many times over — that standalone loops can be electronically unbundled using IDLC (via a GR-303

interface). For reasons that have been set forth sufficiently above, in Verizon VA's initial brief, and in the testimony, it simply is not possible for Verizon VA to unbundle standalone loops for CLECs using the IDLC GR-303 interface using currently available or even foreseeable technology. (VZ-VA Br. at 89-93.) Instead, copper or UDLC must be used, with the result that manual cross-connects cannot be avoided.[158/]

In their brief, Petitioners suggest that Verizon VA's non-recurring rates nonetheless should provide CLECs with the cost advantages of IDLC because it is efficient for Verizon; any other result, they argue, would somehow be unfair. (AT&T/WCom Br. at 211-12.) But this argument fails on many levels. First, of course, where it is possible and efficient to provision loops using IDLC — specifically (and exclusively) in the case of UNE-P — Verizon VA does so. The UNE-P costs in Verizon VA's non-recurring cost model thus reflect the savings associated with the amount of IDLC that Verizon VA expects to have in place in its forward-looking network at the end of the three-year planning period. (VZ-VA Ex. 124 at 15-16.) Second, Petitioners conveniently forget — as they do in the case of OSS — that the statute gives Verizon VA the right to recover its TELRIC costs of providing UNEs.[159/] The statute does not limit Verizon VA to only a small portion of its costs in order to ameliorate technology limitations that make it impossible to provide Petitioners with something they desire.[160/]

[158/] Petitioners' model eliminated cross-connects in the central office even for UDLC and copper by assuming 100% Dedicated Inside Plant. Verizon VA has established, and Petitioners have admitted, that no efficient real-world carrier would employ that practice (VZ-VA Br. at 199-200), and Petitioners do not even attempt to defend that assumption in their brief.

[159/] *See* 47 C.F.R. § 51.505.

[160/] Indeed, because the record establishes that unbundled standalone loops cannot be provisioned using IDLC, Verizon VA has even met the standard used by the New York administrative law judge that AT&T/WorldCom argue should be adopted here: Verizon has

2. OSS, Fallout, and Manual Handling

AT&T/WorldCom also seek to base non-recurring costs on hypothetical OSS that they allege would permit full automatic "flow through" of wholesale orders. Although they admit they have never observed such systems firsthand or known of any carriers who employ them to provision UNE orders (Tr. at 4662), they suggest that "flow-through systems" have developed over the last two decades such that what they envision *should* be possible. (AT&T/WCom Br. at 208.) Petitioners accordingly wish away the vast majority of errors that must be addressed manually. But while systems that have developed over the last two decades have greatly enhanced the ability of orders to flow through the system electronically, those systems do not permit — and will not permit in the foreseeable future — the level of near perfection assumed by AT&T/WorldCom. Orders designed to flow through the system will continue to fall out.

Furthermore, some orders are, and will continue to be, designed to be handled manually. Petitioners do not account in any way for cases where manual handling by design is either necessary or cost effective — even though their own witness, Mr. Walsh, conceded that automating all tasks would not be cost-efficient. (Tr. at 4658.) As Verizon VA previously has explained, despite advances in technology, there are some low-volume and complex tasks that continue to be more efficiently performed manually because the one-time cost of automating them would outweigh the costs of performing them manually over time. (*See* VZ-VA Ex. 116 at 10-11.)

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shown that it would be unreasonable to adjust Verizon's rates to reflect IDLC connections for unbundled loops. (*See* AT&T/WCom Br. at 212.)

Verizon VA's model recognizes these realities and adopts forward-looking assumptions concerning the appropriate level of fallout and manual handling based on its real-world experience provisioning CLEC orders; Petitioners insist, with no supporting evidence whatsoever, that CLEC errors will cause 2% of all orders to fall out and that only this paltry amount may be considered in a non-recurring cost model, although the 2% figure appears to be a number they simply have made up. Petitioners fail to defend their approach in their brief.[161/] Instead, they make a few isolated criticisms of Verizon VA's study in connection with the level of fallout and manual handling it reflects at the ordering and provisioning stages. Each of Petitioners' criticisms and claims fails. Ultimately, they are unable to establish any activities or times in Verizon VA's model that should be eliminated or reduced.[162/]

[161/] Petitioners attempt to overcome their lack of evidence by asserting that the systems and processes they assume are those that Verizon VA uses in its retail operations. (AT&T/WCom Br. at 207.) They are wrong. First, AT&T/WorldCom's model is not at all based on the same systems and processes Verizon employs to provide similar functions for its retail operations. For example, while AT&T/WorldCom concede that certain services (such as a 4-wire unbundled loop) by their nature must be manually designed in both the retail and wholesale worlds, their model apparently assumes some non-existent system can perform that work. (VZ-VA Ex. 116 at 25.) Second, even if AT&T/WorldCom's model were premised on the same systems and processes that Verizon employs in its retail operations, it would still fail to capture the non-recurring costs Verizon VA incurs in its wholesale operations. Throughout these proceedings, AT&T/WorldCom have ignored the differences between the wholesale and retail environments, assuming, despite overwhelming evidence to the contrary, that anything that can be done in the retail environment can and should also be done in the same manner in the wholesale environment. But that is wrong. For example, some steps and work groups, such as those involved in coordination between Verizon and the CLECs, are not necessary in the retail world, where there is only one carrier and thus no outside company with which to coordinate. Likewise, as discussed above, certain technologies (such as IDLC) that might function well when a single carrier is providing its own retail service, may not be useful to provision similar services to CLECs on a wholesale UNE basis.

[162/] Indeed, perhaps to hide the degree to which they have assumed away manual work, AT&T/WorldCom even wrongly describe their own model. They state that the model "identifies 225 detailed steps that may occur when a CLEC order is placed." (AT&T/WCom Br. at 206,